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U. S. DEPARTMENT OF AGRICULTURE ★ SOIL CONSERVATION SERVICE

WATER SUPPLY OUTLOOK FOR MONTANA

and
FEDERAL - STATE - PRIVATE COOPERATIVE SNOW SURVEYS

Collaborating with

MONTANA AGRICULTURAL EXPERIMENT STATION

AS OF

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STATEWIDE OUTLOOK

MOUNTAIN SNOWPACK

Precipitation for the last half of May has been near or above average in most mountain areas. The high elevation snowpack is still below average in all areas.

Most of the precipitation that fell over the past two weeks was rain. Some cool storms near mid-month did drop snow in southern Montana. The melt rates for the last half of May were somewhat less than normal for this time of year. The present snowpack in the high elevations varies from 70 to 85 percent of average in the Flathead River Drainage and along the Divide between Butte and Helena. Water content of the snow in the Bitterroot and Yellowstone River headwaters is still in the 30 to 50 percent range.

Precipitation amounts recorded at SNOTEL sites for the period from May 15-31 vary from about 2 inches to 6 inches. The area roughly encompassed by a line from Butte to Missoula to Great Falls to Bozeman received 3 to 5 inches with most of it coming from May 20-22.

Soils in most areas in central and southwest Montana are saturated from these rains and snowmelt. Much of the precipitation that falls in these areas in the next few weeks will become streamflow as soils cannot hold any significant amount of water until some drying occurs.

STREAMFLOW FORECASTS

Rainfall during May has improved the water supply outlook over much of the state. Some areas have had record high peak flows. These include the East Gallatin River and its tributaries near Bozeman, nearly all streams with headwaters near the Continental Divide from Butte north to the Rogers Pass area, and some streams flowing northerly from the Big Belt and Little Belt Mountains.

The cool weather has slowed snowmelt rates but the snowpack levels still remain low.

The recent moisture has helped to delay the development of water shortages. However, unless June and July precipitation continues in the average or above average range, problems are still expected to occur on many drainages, particularly the Bitterroot and Yellowstone River systems.



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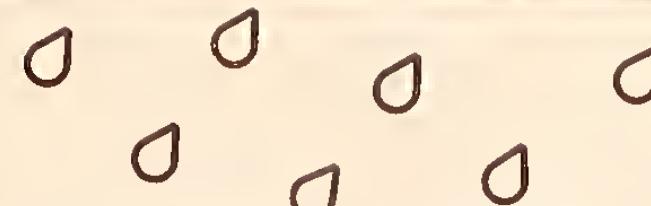
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STORM OF MAY 19-23, 1981

The highest peak flow of record occurred on many streams in the East Gallatin, Upper Clark Fork, Boulder River, Ten Mile Creek, Prickly Pear Creek, Belt Creek and Smith River Drainages in central, west central and southwestern Montana.

Precipitation had been quite extensive over most of the western half of Montana from about May 8-12 and May 15-17. Temperatures were warm during the later storm and snow was melting in the mountains. Soils were nearing full capacity. Many areas started to receive additional moisture on the 19th and 20th with heavier amounts falling on the 21st. Precipitation started to taper off by the 22nd. As the soils became saturated, excess water began filling and overflowing stream channels.

Data from SNOTEL sites showed that some interesting and different conditions occurred during this storm. In many areas near the center of the storm, precipitation at foothill and lower elevations was greater than at higher elevations. This is apparently due to the warm moist weather system being uplifted by a colder weather system. Also, many areas that had snow in the 6000-8000 ft. elevation zone showed additional water being contributed from snowmelt.

The following preliminary data was obtained from SNOTEL sites in or near the major area affected by this storm:

LOCATION & DATA SITE	Eleva- tion (ft.)	Precip. (in.)	Snowmelt SWE (in.)	Increase in SWE (in.)	Net Impact to Runoff (in.)
GALLATIN RIVER DRAINAGE					
Bridger Bowl	7250	5.0	1.9		6.9
Lick Creek	6860	3.5	1.4		4.9
Maynard Creek	6210	4.0	2.2		6.2
Shower Falls	8100	2.5		0.4	2.1
CONTINENTAL DIVIDE - BUTTE TO ROGERS PASS					
Basin Creek	7180	2.7			0.2
Frohner Meadow	6480	4.4	2.8		7.2
Nevada Creek	6480	3.4	3.0		6.4
Rocker Peak	8000	3.0			3.0
ANACONDA - PHILLIPSBURG AREA					
Barker Lakes	8250	2.6			0.8
Black Pine	7100	2.9	1.8		4.7
Combination	5600	2.7			2.7
Skalkaho Summit	7260	1.8	0.5		2.3
Warm Springs	7800	2.5	0.1		2.6
BLACKFOOT RIVER DRAINAGE					
Copper Bottom	5200	2.2			2.2
Copper Camp	6950	3.6	8.4		12.0
Lubrecht Flume	4680	1.9			1.9
North Fk. Elk Creek	6250	1.6			1.6
(Also see Nevada Creek under Continental Divide)					
CONTINENTAL DIVIDE - ROGERS PASS TO SUMMIT					
Badger Pass	6900	3.2	4.5		7.7
Mount Lockhart	6400	3.3	2.0		5.3
Pike Creek	5930	1.5	4.2		5.7
Waldron	5600	2.2			2.2
BIG BELT MOUNTAINS					
Boulder Mountain	7950	2.9	2.4		5.3
Pickfoot Creek	6650	3.0	1.0		4.0
LITTLE BELT MOUNTAINS					
Deadman Creek	6450	1.3			1.3
Spur Park	8100	2.3	2.5		4.8
SNOWY MOUNTAINS					
Crystal Lake	6100	3.4	3.3		6.7

The National Weather Service is responsible for obtaining precipitation data at climatological stations. The Geological Survey is responsible for streamflow measurements. Many other Federal, State, and private agencies also have data that would be helpful in documenting all the variables that are related to this event.

SNOW SURVEY DATA

SNOW June 1, 1981									
DRAINAGE BASIN AND SNOW COURSE			THIS YEAR			PAST RECORD			
NAME	Elevation	Date of Survey	Snow Depth (inches)	Water Content (inches)	Water Content (inches)	Year	Average	Year	Average
ARCH FALLS	7350	5/28	6	2.2	1.7	10.2	—	—	—
BADGER PASS	6900	5/28	45	20.7	19.2	41.3	—	—	—
BADGER PASS PILLOW	6900	5/28	SP	15.6	10.9	—	—	—	—
BANFIELD MOUNTAIN	5600	5/29	0	0	0	7.6	—	—	—
BANFIELD MOUNTAIN PILLOW	5600	5/29	SP	0	0	4.2	—	—	—
BARKER LAKES PILLOW	8250	6/01	SP	12.9	—	—	—	—	—
BASIN CREEK	7180	5/28	16	4.9	—	—	—	—	—
BASIN CREEK PILLOW	7180	5/29	SP	9.7	—	—	—	—	—
BEACLE SPRINGS	8850	6/01	EST	0	3.0	—	—	—	—
BEACLE SPRINGS PILLOW	8850	6/01	SP	0.2	2.7	—	—	—	—
BEAR PAN SKI AREA	5200	5/28	0	0	0	—	—	—	—
BIG CREEK	6750	5/27	77	39.0	28.5	44.3	—	—	—
BLACK PINE	7100	5/28	0	0	1.2	4.1	—	—	—
BLACK PINE PILLOW	7100	5/28	SP	0	2.0	4.4	—	—	—
BLOODY DICK	7600	6/01	EST	0.0	0	—	—	—	—
BLOODY DICK PILLOW	7600	6/01	SP	0.0	0.7	—	—	—	—
BLUE LAKE	5900	5/28	0	0.0	0	14.7	—	—	—
BOULDER MOUNTAIN	7950	6/01	EST	13.0	8.5	—	—	—	—
BOULDER MOUNTAIN PILLOW	7950	6/01	SP	11.1	7.1	—	—	—	—
BOX CANYON	6670	6/01	EST	0.0	0	—	—	—	—
BOX CANYON PILLOW	6670	6/01	SP	0.0	0	—	—	—	—
BOXELDER CREEK	5100	5/28	0	0.0	0	—	—	—	—
BRIDGER BOWL	7250	5/27	34	16.0	3.1	23.6	—	—	—
BRIDGER BOWL PILLOW	7250	5/27	SP	15.0	2.6	19.8	—	—	—
CALVERT CREEK	6450	6/01	EST	0.0	0	—	—	—	—
CALVERT CREEK PILLOW	6450	6/01	SP	0.0	0	0	—	—	—
CASHE CREEK	7800	6/01	EST	0.0	—	—	—	—	—
CASHE CREEK PILLOW	7800	6/01	SP	0.0	—	—	—	—	—
CHICKEN CREEK	4060	5/28	0	0.0	0	—	—	—	—
CLOVER MEADOW	8800	6/01	EST	13.5	6.0	—	—	—	—
CLOVER MEADOW PILLOW	8800	6/01	SP	12.7	5.7	—	—	—	—
COLE CREEK	7850	5/28	25	11.4	0	19.5	—	—	—
COLE CREEK PILLOW	7850	5/28	SP	12.8	0	18.6	—	—	—
COMBINATION	5600	5/28	0	0.0	0	—	—	—	—
COMBINATION PILLOW	5600	5/28	SP	0.0	0	0	—	—	—
COPPER BOTTOM	5200	6/01	EST	0.0	0	—	—	—	—
COPPER BOTTOM PILLOW	5200	6/01	SP	0.0	0	0	—	—	—
COPPER CAMP	6950	6/01	EST	3.0	0.5	—	—	—	—
COPPER CAMP PILLOW	6950	6/01	SP	3.4	1.0	19.1	—	—	—
CRYSTAL LAKE	6100	6/01	EST	0.0	0	—	—	—	—
CRYSTAL LAKE PILLOW	6100	6/01	SP	0.0	0	—	—	—	—
DARKHORSE LAKE	8600	6/01	EST	22.0	—	—	—	—	—
DARKHORSE LAKE PILLOW	8600	6/01	SP	20.3	—	—	—	—	—
DEADMAN CREEK	6450	5/29	0	0.0	0	.4	—	—	—
DEADMAN CREEK PILLOW	6450	5/29	SP	0.0	0	0	—	—	—
DEVILS SLIDE	8100	5/28	40	16.2	14.6	25.5	—	—	—
DIVIDE	7800	6/01	EST	0.0	1.0	—	—	—	—
DIVIDE PILLOW	7800	6/01	SP	0.0	1.4	1.0	—	—	—
EMERY CREEK	4350	6/01	EST	0.0	—	—	—	—	—
EMERY CREEK PILLOW	4350	6/01	SP	0.0	—	—	—	—	—
FATTY CREEK	5500	5/27	0	0.0	0	9.1	—	—	—

SNOW June 1, 1981									
DRAINAGE BASIN AND SNOW COURSE			THIS YEAR			PAST RECORD			
NAME	Elevation	Date of Survey	Snow Depth (inches)	Water Content (inches)	Water Content (inches)	Year	Average	Year	Average
NEZ PERCE CAMP	5580	6/01	EST	0.0	—	—	—	—	—
NEZ PERCE CAMP PILLOW	5580	6/01	SP	0.0	—	—	—	—	—
NOISY BASIN	6040	6/01	EST	29.0	—	43.5	—	—	—
NOISY BASIN PILLOW	6040	6/01	SP	24.0	—	31.3	—	—	—
NORTH FK. ELY CREEK	6250	6/01	EST	0.0	.0	2.0	—	—	—
NORTH FK. ELY CREEK PILLOW	6250	6/01	SP	0.0	.2	1.6	—	—	—
NORTH FORK JOCKO	6330	5/28	44	20.4	5.5	29.5	—	—	—
NORTHEAST ENTRANCE	7400	6/02	0	0.0	—	.7	—	—	—
NORTHEAST ENTRANCE PILLOW	7400	6/02	SP	0.0	—	.0	—	—	—
OPHIR PARK	7150	5/30	0	0.0	—	12.2	—	—	—
PETERSON MEADOWS	7200	6/01	0	0.0	.6	1.8	—	—	—
PETERSON MEADOWS PILLOW	7200	6/01	SP	1.7	1.3	2.7	—	—	—
PICKFOOT CREEK	6650	6/01	EST	0.0	—	—	—	—	—
PICKFOOT CREEK PILLOW	6650	6/01	SP	0.0	—	—	—	—	—
PIKE CREEK	5930	6/01	EST	0.0	—	—	—	—	—
PIKE CREEK PILLOW	5930	6/01	SP	0.0	—	—	—	—	—
PLACER BASIN PILLOW	8830	6/01	SP	12.0	—	—	—	—	—
POORMAN CREEK	5100	5/29	0	0.0	0	11.9	—	—	—
POORMAN CREEK PILLOW	5100	5/29	SP	0.0	0	10.3	—	—	—
PORCUPINE	6500	6/01	EST	0.0	—	—	—	—	—
PORCUPINE PILLOW	6500	6/01	SP	0.0	—	—	—	—	—
RED MOUNTAIN	6000	6/02	0	0.0	.0	5.4	—	—	—
RED TOP	5260	6/02	0	0.0	0	—	—	—	—
ROCKER PEAK	8000	6/01	22	8.8	5.0	10.5	—	—	—
ROCKER PEAK PILLOW	8000	6/01	SP	16.3	11.6	15.4	—	—	—
ROCKY BOY	4700	5/28	0	0.0	0	0	—	—	—
ROCKY BOY PILLOW	4700	5/28	SP	0.0	0	0	—	—	—
SADDLE MOUNTAIN	7940	6/01	EST	8.0	6.0	22.4	—	—	—
SADDLE MOUNTAIN PILLOW	7940	6/01	SP	8.7	6.8	22.5	—	—	—
SHOWER FALLS	8100	5/28	46	19.8	17.1				

SNOW PILLOW DATA

